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HEARING

BEFORE THE

COMMITTEE ON PUBLIC HEALTH

ON

Dangers to Human Life from Bacilli of Tuberculosis in Milk

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CONTENTS.

HEARING.

ROOM 14, STATE HOUSE, BOSTON, MASS.
Feb. 2, 1891, 10.30 A.M.

Mr. GILMAN (the Chairman).— Mr. Clerk, will you please read the petition?

(The petition is read by the Clerk.)

Mr. THOMAS MOTLEY.— As President of the Society for Promoting Agriculture, I will simply state this. We desire, for the purposes of this hearing, that Dr. Ernst may read his report, and that Dr. Austin Peters may also read his report. We have prepared no regular bill; but we desire to ask the Legislature to do something to protect the inhabitants from this trouble, and also to protect the farmer, that he may not be made to suffer either. I do not know that there is anything more that I have to say now. At the proper time we shall probably present a bill. I will ask Dr. Ernst to address the Committee.

Dr. HAROLD C. ERNST.— Mr. Chairman and Gentlemen of the Committee: For something like three years, at the instance of the Trustees of the Society for Promoting Agriculture, it has been my duty to conduct a series of experiments bearing upon the question which they have placed before you this morning. Previous to presenting to you the results of the experimental evidence which we have gathered during that time, it seems to me that a few words in regard to the importance of this investigation might make the subject a little clearer, and may furnish a reason for the movement which has been taken in this matter.

The CHAIRMAN.— Allow me to ask, right here,— for this is a question of some importance,— have you a condensation of your thoughts that you could submit to us in type-writing, or in any way?

Dr. ERNST.— I think that you have that, sir, in the report already in your hands. In addition to what there is in that

report, the tables of the experimental work, which are of no practical value so far as the reading is concerned, have been prepared; but I think you will find in that report all that is necessary.

In regard to the importance of this investigation, that is something which will be readily seen when it is considered that tuberculosis is the most wide-spread disease which affects humanity. It is unquestionable that, in all civilized countries, at least one-seventh of the deaths from all forms of disease in human beings are due to this one thing. It is also true that tuberculosis is one of the most common diseases among cattle which are used for a milk supply,— that is to say, among cattle which are kept under confined conditions: and the results of investigations for the last seven or eight years have shown distinctly that this disease is due to a special micro-organism, that the disease occurring in human beings and in cattle is exactly the same, and that, by inference, the occurrence of the disease in cattle used for a milk supply helps on the occurrence of the disease among human beings. Whether that was true or not was the question which was put before us as the expert investigators of this Society to determine.

In regard to the wide-spread nature of this disease there is hardly a person in any civilized community who cannot name some member of his family who has been attacked by it. It is not confined, as is popularly supposed, to the lungs. Tuberculosis of the lungs is commonly known as consumption: but it occurs in all parts of the body,— as surgical tuberculosis of the joints, as tuberculosis of the membranes of the abdominal organs, as the localized skin disease called lupus, which is precisely the same thing as tuberculosis occurring elsewhere, except that it is located in the skin, and as the dreaded disease called leprosy, to keep which disease from our shores such active measures have been taken by the Boards of Health,— for leprosy, I have little doubt, will within a short time be included under the head of tuberculosis. There is but one small link in the chain of evidence connecting leprosy with tuberculosis wanting; and to the minds of those who are expert on this question there is little doubt to-day that leprosy is a form of tuberculosis. These facts illustrate, it seems to me, very markedly the importance of an investigation of this kind.

Now, the importance of such an investigation having been determined, the question is, How is it that the disease arises? and that can be stated very briefly. I have brought here illustrations of the cause of the disease; and I have them here, in microscopic preparations, under the microscope on the table. Here I have photographs of the micro-organism which produces the disease, as you see there. (Photographs shown.) I have also the organism in the living state, the culture being placed in this copper tube, so that it cannot be broken.

The evidence in regard to the cause of tuberculosis has been accumulating only for about eight years. Before that time its infectious principle was merely suspected. The first definite evidence of its infectious nature was offered only twenty-five years ago by Villemin, a Frenchman. It had been suspected before that, but the first scientific evidence of it was not offered until that time. But the infectious principle, the cause, of the disease was entirely unknown until the announcement of Robert Koch, of Berlin, who, after a long series of experiments, proved beyond a shadow of a doubt that tuberculosis is due to the activity of a minute organism included among the bacteria; in other words, that the "bacillus of tuberculosis" is the cause of this disease in all its forms, no matter where they occur. It is produced by this organism. It is never produced *de novo*. It always comes by reason of the entrance of this organism into the human body, and it is distinctively and emphatically *an infectious disease*.

Now, this organism is one which it is not easy to destroy. It retains its vitality under a number of different conditions. Drying will not destroy it. One of the most remarkable series of experiments that I know of in regard to that fact has been conducted in my laboratory by Dr. A. K. Stone, in which this organism, after an extreme degree of drying, has been shown to retain its vitality and infectious properties for a period of three years and a half at least. The results of these experiments are about to be published in pamphlet form, and will come out in the course of a few weeks.

In regard to the infectious nature of tuberculosis, there can be absolutely no doubt.

As to the literature on the subject, I have here something like two thousand references to articles written in all languages, and in different parts of the world, bearing upon and proving the infectious nature of tuberculosis; and these articles include only the literature extending over about the past seven years. Of course it would be absurd to attempt to read to you what these different authorities say on the subject, but here is a list of the literature collected; and, if any one needs further proof, he will only require to look at a few of the articles on this subject here collected.

The infectious nature of tuberculosis being settled, then comes the question of how the disease is spread; and, speaking generally, there are three ways in which this occurs: in the first place, by the inhalation of dried expectoration, which is present in all our streets and in all civilized communities; and this accounts for the common occurrence of tuberculosis of the lung, or consumption, because this dried expectoration is such a common matter in the streets of our cities. It is only within a few years that the importance of controlling the expectoration of tuberculous material in the streets has made itself manifest even to medical gentlemen. At the same time, when it is recognized that every time a person having tuberculosis of the lung expectorates, he also scatters abroad an indefinite number of these bacilli in active vitality, it will be seen to be an extremely important matter.

The next method of spreading this disease is by direct inoculation; that is, by these bacilli of tuberculosis effecting an entrance through a lesion either of the skin (which would be called a "cut," of course, with something infected with tuberculosis material) or through the mucuous membranes of the mouth or other parts of the body. One of the most perfect illustrations of how this is brought about is under my charge to-day,—a case of localized tuberculosis of the tongue. A gentleman, perfectly well Thanksgiving Day, so far as he knew, in some way, by eating something infected with tuberculosis, became infected with tuberculosis of the tongue, because he has or has had (for I am glad to say that he is better now) a nodule half as large again as an English walnut, which is pure tuberculosis, as was shown under the microscope in a piece taken off with the use of cocaine.

The third great method of spreading the disease is by means of the ingesta, or by means of the material that passes through the digestive organs. In this case it is not so easy to diagnose as in the case of tuberculosis of the lung, but it is very common. That being the case, and it being true that, from *a priori* reasoning, a method of spreading this disease can occur through the ingesta, it takes but very little thought to direct our minds toward the special means of its transmission. And, in thinking what is the most universal food that is employed in civilized countries, one does not need to hesitate a moment before saying milk. It is the only animal product which we use uncooked, in a raw condition. It is the one thing which is used by old and young, in all civilized countries. It is the thing upon which we feed the babies; and it is important, particularly for their sakes, that an investigation should be carried out, in order to show whether or not it may contain the virus of the disease.

Now, the suspicion having been aroused that milk may be a vehicle for the transmission of tuberculosis, how shall we prove it? In this connection, it seems to me that it would be quite proper to speak of the investigations of Dr. E. F. Brush, of Mt. Vernon, N.Y., who has taken up this question of the infectiousness of milk for the last few years, not especially from the experimental side, but from the statistical side; and, judging from a paper which he published last year, as the result of investigations carried on for a number of years before, and extending through the statistics of the world, he certainly believes himself, and seems to show, that tuberculosis does not exist among people that do not employ milch cattle. Certainly, it is a coincidence — whether it is the actual fact or not we are unable definitely to say but this is what he shows — that tuberculosis does not exist excepting in countries where ordinary milch cattle, milch kine, as distinguished from goats, etc., are used for furnishing the milk supply. His papers are scattered through the New York *Medical Journal*, and I can give you the references if you care for them: they are all here.

Now, as another side of his investigations, he shows that in countries where the milk supply is derived from goats or from mares there is no tuberculosis, which follows out per-

fectly the natural history of the disease, because neither goats nor mares are affected by tuberculosis.

The CHAIRMAN.— Would the presence of milch cows where the milk was not used, but where the flesh was used, produce the same effect?

Dr. ERNST.— No, sir. I shall have a little to say later about the infectiousness of tuberculous meats.

The CHAIRMAN.— Why I ask the question is because I have a country and a people in mind where cattle are plenty, but where the inhabitants seldom drink the milk, and yet those people have a good deal of tuberculosis.

Dr. ERNST.— You must remember that, in this discussion, we do not exclude other sources of infection. I am simply trying to show that milk *may be* a source of infection for tuberculosis. It should be borne in mind that another source of infection, by means of inhalation, is quite as active, even where milk is used as a food.

In endeavoring to show whether milk from cattle affected with tuberculosis contains the infectious principle or not, scientific investigations would be divided into two classes; and those classes would include, in the first place, matters of opinion and, in the second place, matters of fact.

Now, in regard to matters of opinion. Before coming before a committee of this kind with any claim whatever, it seemed to me that one of the first things that the Committee would want to know would be, "What do other medical gentlemen think in regard to this question?" and, in order to satisfy that inquiry, even before it is asked, I will say that about a year ago I sent out a circular letter to something like two thousand medical and veterinary men. I sent it to every member of the Massachusetts Medical Society of five years' standing. I sent it also to members of the American Surgical Association, the Association of American Physicians, and one or two other special medical societies in different parts of the country. Dr. Peters furnished me with a list of the veterinarians; and I sent to members of the United States Veterinary Association, receiving a very large number of replies. The letter which I sent out read as follows. (The letter is read.) The letters that were collected are here; but it is not, of course, proper that I should take up your time in reading them all. I have

summarized the conclusions, in order that I might give you some idea of what the medical men think of this question. A number of the letters are of very great interest. But it should be said, in summarizing them all, that out of the twelve or thirteen hundred answers that I received there were but two which expressed an absolute disbelief in milk as a vehicle for the virus of tuberculosis; there were a large number of gentlemen who expressed their belief in it; a large number who stated, what is perfectly true, the difficulty of proving such a thing, but expressed their belief in it; and a comparatively small number who furnished me with cases which they believed were distinctly traceable to the milk coming from tuberculous cows.

I have records of cases of probable infection of children from the milk of mothers with tuberculosis of the lung and mamma. I have cases of the infection of children from milk coming from a tuberculous cow. I have a large number of cases from the veterinarians, showing the infection of calves from tuberculous cows; and it seems to me impossible to resist the conclusion that, notwithstanding the fact that the attention of medical men has not been attracted to this point, excepting within the last year or two, the amount of evidence obtained from the clinical side is very great.

With your permission, if I can find one letter, I will read it to you. This is a letter which is dated Cheraw, S.C. (The letter referred to is read.) That is, of course, a letter not bearing distinctly upon this question of the infectiousness of milk from tuberculous cattle; but, it being granted that the disease is the same in human beings as in cattle, the inference is irresistible that the same thing may come from the milk of tuberculous cattle, provided that we can show that that milk contains the virus. I have other letters here giving an account of children who have become affected with tuberculosis as the result of using the milk of tuberculous cows; but the one which I have just read happened to strike my eye, and so I gave it.

Another point in our investigation related to the existence of tuberculosis among people not using milk from tuberculous cattle, or exercising care in its use; and it was thought that, if such people existed, it would be a matter of interest to learn whether tuberculosis occurred among them

to any extent or not. In our own community we have one distinct class of people who are supposed to exercise care in the selection of the meat they use,— they are the Jews,— and, of course, it is a matter of interest to discover whether the Jews are as much affected by tuberculosis as people of other religions. To that end, Dr. Henry Jackson, who has worked with us in these investigations, has collected the facts, which, with your permission, I will present to you. Beginning his article in this way, he goes on to say that "among the replies received by Dr. Ernst, in response to a circular sent out in May, 1890," — that, of course, should be January, 1890,— "as to the frequency of tuberculosis," etc., (reading the article referred to). That seems to indicate that tuberculosis is less common among the Jews.

The CHAIRMAN.— Do the Jews not use milk?

Dr. ERNST. Only when it comes from cattle that have been carefully inspected. That is precisely the point upon which we are working to-day: that among people who use milk only from cattle that have been carefully inspected tuberculosis is less common. It seems to be less common among the Jews. We are endeavoring to show that milk from tuberculous cattle is infectious; and it is true that Jews do not use milk, excepting when it comes from cattle that are known to be healthy, or at least from cattle over which some supervision has been exercised with a view to determining the condition of their health.

The CHAIRMAN.— Do you mean to say that the Jews do not use the milk which is commonly sold by the Boston milkmen?

Dr. ERNST.— I do not mean to say that that is so absolutely. I mean to say that, if the Jews act in accordance with the laws of Moses, they do not take milk from the regular milk-dealers in Boston, excepting when they know its source to be healthy.

Now, having dealt with the matters of opinion with reference to the infectious nature of milk from cattle affected by tuberculosis, my next series of evidence will be in regard to matters of fact, as shown by the experimental evidence which we have to place before you.

In settling any such question as this of the infectiousness of milk coming from tuberculous cattle, a research must of

necessity be extremely difficult of accomplishment: and that is one reason why I have brought the preparation of the bacillus of tuberculosis and placed it under the microscope for your inspection, in order to demonstrate to you the minute size of the organism producing the disease. Necessarily, the search for the virus must be a search for the bacillus of tuberculosis in the milk which is supposed to contain it; and, after you see the minute size of this organism and recognize that one way of proving its presence is the actual seeing of it, it will be very easy for you to understand how difficult such an investigation as this is, and why it would have been perfectly possible for us not to have been able to present any statistics at all: whereas, on the other hand, we *can* show you a good deal. The difficulty of finding the organism is very great in milk: there is no chemical way by which its presence can be shown. The first way to prove its presence is by seeing it; and the second way to prove its presence is by means of the results of inoculations.

Now, we have carried out these two kinds of experiments, and, as it seems to me, pretty thoroughly. The method of doing so has been made possible only by the liberality and the public spirit of the trustees of the Society which I represent. There has been no such investigation carried on in this or any other country before. It is an expensive matter, and one that must be carried on without the probability of a return for the money invested. It may be like throwing money into a hole, without ever securing or expecting any return. But, notwithstanding that fact, the Society, having secured a farm situated in a healthy locality in the country, have given every possible support that could have been desired to the work. The farm was placed under the most perfect hygienic conditions. Of course the methods which are used are technical, and of little interest to the Committee; but that is the fact. It was, in the first place, in a healthy exposure: the drainage was made perfect, and the buildings were put in excellent repair, and in perfect condition from a scientific point of view; and that farm was supported during all the time that was necessary for reaching these results. The cows that were selected for experiment were kept there; and the beneficial effect of such treatment

as they received is only a further illustration of the point that we are trying to prove, that good hygienic surroundings should be required for all milk-giving cattle, because cows that were brought there in the poorest sort of condition, suffering from tuberculosis, either did not lose any more, or else they gained, and, in certain cases, apparently got well. All of which goes to show what can be done by careful supervision of cattle that are used for milk supply.

In these investigations, our first point was to secure cattle that were affected with tuberculosis, but not of udder, the *because the infectiousness of milk where tuberculosis has attacked the milk glands has been acknowledged for years*, but we desired to go a step further, and show, if possible, *whether the milk from cows affected with tuberculosis in other parts of the body than in the udder also carried the virus, the udder being healthy;* and, therefore, the cows which were collected at our farm were selected with that special point in view. Dr. Peters exercised a great deal of care, and took a great deal of time in hunting up animals fit for this sort of experiment.

Then, having obtained the cattle, we carried out, in the first place, a long series of microscopic examinations of the milk obtained at different times from the different cattle, making one hundred and twenty-six such examinations; and a single microscopic examination of milk for the bacillus of tuberculosis means three or four days' work. It means the preparation of a large number of "cover-glasses"; it means a careful search of each one for a long time, varying from five minutes, if you find it, to an hour, if you do not find it; and of course it is extremely trying upon one's patience and one's eyesight. But, as a result of that investigation, out of one hundred and twenty-six series of "cover-glasses," in searching for the organism, the bacillus of tuberculosis, in milk coming from cows having no tuberculosis of the udder at all (as was shown and demonstrated by a *post-mortem* examination of the cows), we found it present in the milk in sixteen instances. In other words, we found it present in thirteen per cent. of the examinations that we made.

Now, considering the difficulties of finding it at all, this is to my mind a startlingly large percentage.

We collected evidence of the infectiousness of this milk

by another series of experiments,— by inoculations of the same milk in a series of guinea pigs and in a series of rabbits; and as a result of that treatment, of the inoculation of the rabbits,— we inoculated seventy-four,— in six out of those seventy-four we produced tuberculosis. That also is a remarkable statement to my mind, when it is remembered that the inoculation amounts to the subcutaneous injection of only from one to three drops of the milk; and it means that a little over 8 per cent. of the rabbits experimented upon were shown to be tuberculous after having been treated with this milk.

Dr. READE (of the Committee).— Was this an injection of prepared milk, or did you take it just as it came?

Dr. ERNST.— Just as it came,— sometimes of the milk and sometimes of the cream. That is a secondary question. It can be differentiated by reference to the tables of the inoculations; but the result shows that the virus may be present in either the milk or the cream. After the cream has been separated, it is just as likely to be virulent as the milk.

The second series of experiments was made upon guinea pigs, and a little larger percentage was obtained. Out of seventy-seven animals inoculated there were ten in which tuberculosis was produced; that is to say, in a little over 13 per cent. in the case of guinea pigs. It should be said that the question of previously existing tuberculosis in these animals, and the source of error that might arise from that fact, was guarded against as carefully as can ever be done in such investigations as this. The animals were kept under observation for a long time before they were inoculated at all, and they were selected particularly because of their healthy condition.

Then we had, as a second series of experiments, to show this virulent condition of the milk coming from the cattle affected with tuberculosis, a series of *feeding experiments;* and we fed a series of animals with the milk coming from the cows of which I have spoken. We have here a complete table, a complete record, of all the cows that were used for experiments, showing where they came from, how long we had them under observation, and what the results were of the *post-mortem* examination.

Dr. READE (of the Committee).— Did you ever inoculate

any of these guinea pigs and rabbits with milk in which you did not find bacilli?

Dr. ERNST.— Yes. This — the inoculation of the milk — is one of the ways by which we endeavored to determine the presence of the virus.

Dr. READE (of the Committee).— I mean in any of these cases that you have spoken of, where you took a given number of rabbits or guinea pigs?

Dr. ERNST.— Yes. It was the milk of the cows at the farm, and it was done for the purpose of determining the presence of the virus. Even if we do not discover it under the microscope, it might be there: and we did the inoculation experiments in addition to our examinations under the microscope, for the purpose of determining whether the virus was there.

For the feeding experiments a litter of twelve healthy pigs, born of healthy parents, were fed with the milk from cows that we had used for experimenting in other directions; and, out of these twelve pigs, five showed tuberculosis — that is, almost fifty per cent.— in the feeding experiments.

We also used twenty-three calves for feeding experiments. Calves that were born of healthy parents were taken before they had had milk from other sources at all, within twenty-four hours of the time of their birth, and placed upon the milk of these cows that we had at the farm; and, of these, eight became tuberculous by the feeding experiments.

There were other feeding experiments made, such as I have spoken of, upon a series of rabbits: and of those there were but two that showed definite tuberculosis. There were several others that were suspicious.

And, then, also a series of feeding experiments were made upon guinea pigs, the results of which are not properly collated, so that I cannot place them before you.

As a matter of interest, it seemed quite a proper thing to attempt to discover whether it were possible to show the existence of this virus in the milk supply of the city of Boston, as it is furnished by the dealers,— whether, mixed as it is, diluted as this virus must of necessity be (because, of course, in a herd, it is not reasonable to suppose that all the cattle used for milk supply are affected with tuberculosis), if there were only one, and the milk from that cow were

very strongly infected with the bacillus of tuberculosis, and then were mixed with the milk from a number of other cows, the virus would be much diluted. The question was whether we should find it present at all; and, to prove that, or as one of the investigations, we took a series of samples of milk that were collected by Dr. Charles Harrington, the inspector of milk for the city of Boston, and made a similar series of investigations upon the milk obtained in that way to the investigations upon the milk from the cows at our experimental farm. And, in one case under the microscope, and in another case by inoculation experiment, we distinctly showed the presence of this virus of tuberculosis in the milk as it is supplied through the milk-dealers.

An important part of the importance of our results is in regard to the existence of tuberculosis among the cattle that are used for milk supply in this part of the country: and, at my request, Dr. Peters, who is the Society's veterinarian, has written this report, which is submitted to you, and which is the report which you have in your hand, sir, and which you may easily read. The discussion is an extremely interesting one; but the conclusion to be obtained from it is that tuberculosis in cattle is quite too prevalent for the safety of the public health,— in cattle that are used for the milk supply in this part of the country.

Then, as a matter of interest, I have here a series of photo-micrographs, which you may like to look over. They do not show much to one who is not accustomed to appearances under the microscope, but they are photographs of material which has been obtained in this investigation. They are photographic evidence of what we have ascertained, and the results obtained are visible to any one who chooses to look at them.

The results of all this, I think, can be summarized in a few conclusions.

In the first place,— and it almost goes without saying,— tuberculosis is distinctly an infectious disease. It is classed as such in France. There is there an absolute prohibition against the disposal of milk from tuberculous cows, against the sale of meat from tuberculous cattle of any kind.

In the second place, as the result of the work that we have been doing, it is distinctly shown, and to my mind very em-

phatically proved, that the milk of cows affected with tuberculosis may contain and does contain the virus, no matter how extensive or to how small an extent disease may exist in the animal furnishing the milk; and the corollary from that, as shown from the evidence which I have here submitted, as it seems to me, is that the proportion of this milk that is virulent coming from cattle, even with no tuberculosis of the udder, is greater than has thus far or until very lately been suspected.

And, as a conclusion, as a result of all the work that has been done in this direction in different parts of the world, and as a conclusion from this evidence which I have tried to present to you, the virulence of this milk, it seems to me, has been shown to be so possible that some sort of restriction should be placed on milk coming from cows affected with tuberculosis; and I think that some such restriction is absolutely demanded for the good of the public in general and for the protection of the children of the poor in particular.

The CHAIRMAN.— I think that I speak the mind of the Committee when I thank you for your very clear statement of the matter, and for the manner in which you have avoided technicalities and have given us plain information, which, I think, will be very valuable.

Dr. ERNST.— I have endeavored to do so, I am sure. I am very much obliged to you, sir.

Mr. APPLETON.— We have invited many of the Boards of Health within a convenient radius around Boston to be represented here. I do not know how many of them are present. Perhaps some of these gentlemen have something to say.

The CHAIRMAN.— Is any one here representing Cambridge? Is any one here representing Somerville?

Dr. READE (of the Committee).— May I ask Dr. Ernst one more question? I should like to ask Dr. Ernst to state a little more definitely in regard to the results of his examinations of those specimens of milk that were taken from the regular milk-dealers in the city of Boston.

Dr. ERNST.— In what way, sir?

Dr. READE (of the Committee).— You simply stated, I think, that in two cases the bacilli were found; but you did not state how large a proportion those two cases represented of all the cases examined.

Dr. ERNST.— I did not do that, because the whole of the examination is not finished; and we may be able to find more. We made fifty-eight sets of cover-glass preparations. Now, those have not all been examined, because, as I have said, the work is simply tremendous. But thus far, out of those fifty-eight sets of cover-glasses, we have found the bacilli in one. It would be hardly fair to give the result of the complete investigation now.

The CHAIRMAN.— But you do not hesitate to make the remark, do you, Dr. Ernst, as I have it here, that it is distinctly shown in the milk, and that the proportion of the virus is much larger than is generally supposed?

Dr. ERNST.— No, sir: I do not hesitate to say that at all. All that I meant about the milk supply in the city of Boston was that in one instance, under the microscope, we had seen the bacilli, and that in one case of inoculation with a specimen of this milk we produced tuberculosis. I did not intend to say anything about the proportion, only that we did succeed in finding the bacilli there.

The CHAIRMAN.— Dr. Abbot, the Committee would be very glad indeed to hear from you.

Dr. ABBOT.— I will say, Mr. Chairman, that I have not heard the discussion that has already taken place; but the necessity of some supervision in this direction, I think, is quite plain. I have seen the need of this.

The CHAIRMAN.— I may say, sir, recognizing that you have just come in, that the substance of it is given in the last remark which Dr. Ernst made, that there are distinct traces of bacilli in milk which is supplied to the people in the city of Boston, and that there is very much more tuberculosis in the milk than is generally supposed, and that it is really an impending danger threatening the health of the community, particularly of the children of the poor.

Dr. ABBOT.— I think that there is no question as to the truth of that statement. Of course, the milk supply is one of the most important food supplies that we have. It begins with the life of the children, and a large number of children are dependent upon the milk of cows; and we know very well that the health of such children, as compared with the health of those who are fed from their own mothers, is very much poorer, and that their death-rate is greater. Whether

that simple question depends on tuberculosis, of course, I could not say; but it is certain that tuberculosis may be — I think that it is conceded now that it may be conveyed in this way, as one of the modes of infection. Of course, it is conveyed in a great many ways to human beings; but, as this is one of the methods that can be controlled to a certain extent, *it certainly is an important matter, and one which measures should be taken to control.**

The CHAIRMAN.— Is Dr. Harrington's report as milk inspector printed?

Dr. ABBOT.— We have nothing to do with that. That is a city report. Dr. Harrington has charge of the inspection of milk in the city of Boston. We have, in a general way, charge of the inspection of milk throughout the whole State, in the cities and towns; but that question of milk inspection, so far as we have had anything to do with it, has been outside of this matter of tuberculosis, which is now before the Committee. We have to deal merely with the question of fraud. Of course, in some cases, we have to deal with matters affecting the public health; but we have to deal more with the question of fraud than with the matter of health,— that is, we have to do with the preventing of fraud in the adulteration of milk. *But the question of disease, as propagated through milk, is a far greater and a far more important one than the question of adulteration; and it is one which, I think, the State has the same right to control and to supervise and inspect as it has in the simple case of the standard of milk,— thirteen per cent. of solids.*

The CHAIRMAN.— Anything else, doctor?

Dr. ABBOT.— No, sir.

The CHAIRMAN.— Would any member of the committee like to ask Dr. Abbot any questions?

Dr. ERNST.— Mr. Bowditch suggested that I particularize a little in regard to certain facts which I have not presented, because they are in the different reports that I have ready to lay before you; but there is one case in particular that is a very striking illustration of the dangers coming from this milk, and which was brought to my notice by the kindness of Dr. Gage, the City Physician of Lowell. It occurred last spring; and it seems to indicate, as perfectly as anything can, the necessity for some such legislation as we are asking

* The italics are put in to show Dr. Abbot's emphasis.— H. C. E.

for. His attention was attracted to the subject, in the first place, by reason of the letter which I sent out to so many physicians, including himself, last year; and, some two months afterward, he very kindly sent to me specimens of milk coming from a cow where tuberculosis was not suspected. His attention was directed to it by reason of his having under his care a child of less than a year old, that had never been fed upon anything but the milk of this cow, and was developing symptoms of tubercular meningitis; and, after reading a report which I presented about that time, the thought entered his mind, "May not this cow have tuberculosis? and may not the milk from this cow, upon which the child has been fed, have been the means of communicating the disease?" Its parents were perfectly healthy, there was nothing about the house which would account for its condition, and the only theory upon which he could explain it was the possibility of this cow's being tuberculous. He sent a specimen of the milk to me, and my assistants and I found the bacilli of tuberculosis in the milk. We inoculated four animals by a subcutaneous injection of anywhere from three to six drops of this milk, and within six weeks one of the animals upon which we experimented had acute miliary abdominal tuberculosis, as you may see by the photograph. Dr. Gage could find no way to prevent the sale of the milk from that cow unless he bought and paid for her out of his own pocket; and she is to-day, so far as I know, used for a milk supply. Another child was fed upon that same milk, and was developing similar symptoms to those discovered in the child who had died. I have here a photograph showing the miliary tubercles in the abdomen. This is as perfect a case as can be found in scientific literature. It is very difficult to trace the cause and effect as closely as is here done.

Another case, which Mr. Bowditch reminded me of, was that of a cow which had been selected by a gentleman for the use of his baby, with the idea that one cow's milk (a cow of the highest grade and breed) was the best supply. We were carrying on this work, and, as a matter of interest, the milk from that cow was sent to us for examination, and in it we found the bacilli of tuberculosis without any previous suspicion of disease. These two are simply special

cases. We have others that are quite similar in character all through this evidence that I can present to the Committee.

Mr. HEMENWAY.— I should like to ask Dr. Ernst if he supposes that sterilizing milk from a tuberculous cow would remove the danger?

Dr. ERNST.— In reply to that, I should say, without meaning to express any conceit, that, if I sterilized the milk myself, I should be satisfied; but it is not a method that can be applied generally with success. It is not a safe method at all, particularly for the supply of milk to the poor, unless something is done here similar to what is done in one or two of the cities abroad, where the milk is sterilized for the poor at the rate of eight, ten, or twenty thousand flasks a day. But that, of course, is something that we cannot attempt.

The CHAIRMAN.— Is there any other gentleman present now connected with any of the Boards of Health in the vicinity of Boston that would like to say a word?

Dr. CLARK.— I appear, representing the Board of Health of the town of Medford. I will state, as a member of that Board, that I have been brought into contact more or less with tuberculosis in cattle, the existence of which is well known to a number of the gentlemen here. We probably have in Medford the worst stock farm in the State of Massachusetts or, possibly, in this country; that is, I mean by that that the cattle on this farm are probably diseased with tuberculosis to a greater extent than the cattle on any other farm. And, although we know that fact as far as any one can possibly ascertain it, still our Board is powerless to rid the community of that nuisance, if I may use that expression. And the reason for it is this: that the milk from the cows kept on that farm is not sold in Medford. It is sold, probably, in Boston or that portion of Boston called Charlestown; and of course, being disposed of in Charlestown, the Medford Board of Health has no power or authority whatever to exercise supervision over the disposal of that milk. The cattle are fed upon refuse grain and swill; and, while they were quarantined last May, they were fed upon their own milk. The place has been examined by several physicians and several veterinarians, and they all pronounce it as full of germs; and it is a place that will disseminate

disease among cattle, even if they are brought there in a healthy condition. I bring this matter up merely for the purpose of showing you that local Boards of Health have *absolutely no power to eradicate this disease*, except so far as it may be done by quarantining the cattle. The Cattle Commissioners have seen the place; and they feel this way, that the Statutes are not sufficiently definite, that they do not give them sufficient power to warrant their going ahead and treating tuberculous cattle the same as they would treat cattle affected by farcy or glanders or affected with contagious pneumonia. The Cattle Commissioners claim — and they take the ground properly, I think — that they hardly feel warranted in killing cattle afflicted with tuberculosis; and they do not feel warranted in taking the same measures that they would in the case of cattle affected with farcy or glanders. If we take any action whatever, we can simply isolate and quarantine the animals upon the premises of the owner or remove them at the expense of the town.

Now, I think that, if an act were passed by the Legislature, whereby milk farms should be inspected by competent persons, it would be a step in the right direction; and I believe, also, that the mere isolation or quarantining of animals is not a sufficient safeguard against the spread of disease. I believe that, if the animals are found to be diseased with tuberculosis, they should be killed; and if, by any chance, the animals that are killed should be found not to have had the disease, I think, possibly, that the Statute could be so worded that the farmer or the owner of the cows or animals supposed to be diseased should receive a sufficient remuneration. The trouble now is that, if an animal is killed, unless there is an appraisal, the farmer gets nothing; and the farmers and those owning cattle do not take hold of this matter in the way that they would otherwise, because of the fact that they feel that, if their animals are killed, they will receive no recompense whatever. If the Legislature could devise some means whereby those who own cattle which are killed, perhaps because of suspected tuberculosis, and it is afterwards found that they did not have that disease, should receive some recompense for their loss, then I think that the people generally throughout this State would take hold of the matter in a better spirit than they do now.

I think, perhaps, that one reason why they have not taken favorably to the idea so far is because they have been ignorant of the contagious character of the disease.

I have listened with a great deal of interest to Dr. Ernst's paper: and I can speak of one case which came under my notice in my own practice, of a person who contracted tuberculosis by the use of milk. That man came from healthy parents, so far as I could learn. The family history was without taint of tuberculosis. He purchased a cow which he supposed was healthy, and he used the milk a year or more. Last spring he showed symptoms of tuberculosis, and the animal from which this milk was taken showed signs of tuberculosis also. The cow has now been disposed of. I do not know — I am not safe in saying — that the animal had the disease, but every indication is that she had; and that man has to-day what is called consumption.

Now, as far as the prevalence of tuberculosis is concerned, I can give you the certificate for the town of Medford for the past ten years. We have had from one hundred and ninety to two hundred cases of consumption, or tuberculosis. That cause of death is the most frequent that we have in our town. The next greatest cause of death is heart disease, of which I think that we have had some ninety or one hundred cases. So that you can see that tuberculosis prevails to a greater extent, and causes more deaths in the town of Medford, and has caused more deaths there within the past ten years, than any other disease. That appears to bear out the statement made by Dr. Ernst very well indeed.

As I have said before, I believe that there should be more explicit legislation regarding the care of milk farms and the sale of milk. We have our milk inspectors in large cities and in some towns. In my town, they voted two or three years ago to have a milk inspector: but, when it came to the appropriating of money to supply him with the necessary articles for the performance of his duties and a proper salary, the matter was voted down. What is required is direct legislation requiring all towns — and I speak of towns more particularly than cities, because I think that the inhabitants of towns are perhaps a little more lax in matters affecting their health than is the case with the inhabitants of cities, not having been educated up to the necessities — requiring

all towns to have milk inspectors and inspectors of cattle. I think that there should be a careful inspection, by competent persons, of all cattle, more especially cows, kept on the farms from which the supply of milk is obtained by the community; and, in case animals are diseased, they should be killed. And, if it should be found afterwards that the animals were not diseased, sufficient remuneration should be made to the owner.

I believe that that is all that I have to say, Mr. Chairman. That is my experience as a health officer in the town of Medford; and, when I speak of the experience of the town of Medford, I believe that I give the experience of the majority of other towns.

The CHAIRMAN.— The Chair would like to state that the House and Senate have adjourned until 2 o'clock. It is now 12. The Committee are very anxious to get all the information which they can upon this very important subject. If there is anything to be said upon the opposite side of this question, the Committee want to hear it, and want to give every gentleman an opportunity to speak. If the hearing can be closed in three-quarters of an hour, well and good. If not, I think that this matter is of sufficient importance to warrant our adjourning, in order to give every one who desires an opportunity to be heard. I hope that you will try to bear in mind that we are obliged to be in our seats at 2 o'clock, and that we would like to have a chance to get a plate of soup before then.

Hon. Dr. GEORGE B. LORING.— This paper, Mr. Chairman, was not intended to antagonize anybody. I prepared it to read to-morrow before the New England Agricultural Society, which Society I have addressed annually for the last twenty-five or thirty years; and I submit it without the slightest feeling of antagonism, or the slightest desire to overthrow anybody's facts. I submit it for the consideration of open-minded and intelligent men, as coming from the best scientists in this country and in Europe. After some preliminary remarks, I go on to say: "Tuberculosis in animals is evidently," etc., etc. (reading paper).

The CHAIRMAN.— Have you any suggestions, doctor?

Dr. LORING.— None whatever. I merely submit that paper exactly as it is; and I desire to say that I am very

glad to see that the investigations are going on with so much care and diligence.

The CHAIRMAN.— Do you think that legislation is necessary in regard to this matter?

Dr. LORING.— I do not know what legislation is required. If there is anything wanting to strengthen the hands of the investigators, I should let them have it. It is very important that we should know the origin of the disease; and the remedy we ought to find out, if there is any.

Dr. ERNST.— May I say a word or two in reply?

The CHAIRMAN.— I think that perhaps we had better hear the opponents first, if there are any who desire to speak.

Mr. WEST.— I represent the Board of Health of Salem. I only want to say that there have been within the last year or two, or the last two or three years, two entire herds of cows that supplied Salem with milk killed, and that they were all found to have tuberculosis; and, in my opinion,— and I think that in this I speak for the Board,— some legislation, whereby these milch herds could be examined from time to time by experts, would be of very great benefit to the community. I have no doubt that the milk from those cows was sold to Salem consumers for some time before the cows were found to be suffering from this disease. We have a milk examiner there, and samples of milk may be examined for anybody that brings them in, free of charge; but, as a matter of fact, the year before last, not more than two or three samples were brought in to be examined, although, as I say, it is all done entirely free of cost to those who take the samples for examination. I think that, if an act were passed by the Legislature providing for the inspection of milch herds by experts, it would be of great benefit to the community at large.

Dr. READE (of the Committee).— I should like to ask Mr. West for what reason these herds of cows were killed?

Mr. WEST.— On account of tuberculosis.

Dr. READE (of the Committee).— Under what authority?

Mr. WEST.— I am not quite sure of the authority.

Mr. APPLETON.— They were offered voluntarily by the owners.

Mr. WEST.— I should also like to say that one of those herds was comprised of the common grade of cows,— I think grade Ayrshires.

The CHAIRMAN.— Is there any other gentleman here who would like to speak on the affirmative side of this question? If not, Dr. Ernst has the floor again.

Dr. ERNST.— After listening to Dr. Loring's paper, and jotting down a few things as he went along, it seems to me that (without attempting to answer a number of other points, which would appear to require dealing with more at length after his paper shall have been put in print), in order to prevent any possible misapprehension, certain misstatements made by Dr. Loring during the reading of his paper should be corrected now.

In the first place, I think that he made the direct statement that there is first-rate authority for stating that tuberculosis is a self-generated disease. If there is any such authority in existence, all that I can say is that his subsequent insinuation that the scientists in this part of the world are not likely to receive for some time the reports of the researches of scientists abroad upon the subject of tuberculosis, and that they are now presented by him (Dr. Loring) for the benefit of the scientists in this country, is quite justifiable.

Dr. LORING.— Allow me to say that I submitted that statement to a scientist in Washington, and that he agreed with me entirely.

Dr. ERNST.— I believe that I have the floor now, sir.

Dr. LORING.— I do not desire to take the floor away from you, sir.

Dr. ERNST.— If there is such authority for that, we shall all be interested to receive it. The only object of the trustees, I believe, and of myself, is to get at the truth. We have pursued this work very carefully for nearly three years; but, if that authority exists to-day — good authority, such as would be accepted by scientific men in general — for the self-generation of tuberculosis, I confess myself absolutely ignorant of its existence.

On the second point, I believe that the statement was distinctly made that the bacilli of tuberculosis do not multiply outside of the body. Here are millions and millions and millions of bacilli of tuberculosis which have multiplied outside of the body. (Culture of bacilli shown.) They do multiply outside of the body. As bearing upon that, I will

quote an authority from this same University of Johns Hopkins, one of the best technicians of the day.

(Quotation from Dr. Abbot's work, showing advantages of milk as a nutrient medium for the growth of the bacilli of tuberculosis.)

It seems to me that it is not necessary — I had not supposed that it was necessary in introducing this subject — to go over all of the literature and all of the proof relating to the matter: but these statements, so far as my knowledge goes, are contrary to the accepted opinions of the best men in this or any other country.

There has been a good deal said in regard to the statements of the best veterinarians. I do not mean to flatter, I do not mean to say anything which is not fairly warranted, but the best veterinary authority upon tuberculosis is sitting opposite to me to-day, Dr. Austin Peters, of this Society. If he has made any statement opposed to my views as expressed to-day in regard to the existence of tuberculosis in human beings, in regard to any of its characteristics in human beings, I am entirely ignorant of it, and I hardly know how to answer the suggestion that he has.

There was another statement made by Dr. Loring. It was said by him that it was stated by a veterinary authority that bacilli could not be found in the liver. That is the most extraordinary thing that I have heard. Tuberculosis is one of the most common diseases of the abdominal organs, and it may be developed in the liver, the peritoneum, the mesenteric glands, and almost anywhere. There are tuberculous nodules in the liver shown in the photograph which you have before you.

Another thing,— it seems to me as if the whole point of the work which we have been doing for the Society — the whole point of the work that was presented here this morning — is ignored by Dr. Loring. We have worked two years and a half or three years for the purpose of proving that the milk from tuberculous cows is virulent, when there is no tuberculosis of the udder. We state our results, and Dr. Loring says that there is no evidence. It is precisely the evidence that Dr. Abbot quoted here as the article which I published a year ago last spring, and which I have had the honor paid me of having translated and published in Paris,— the same article which was published in the *Practitioner*, in

Edinburgh; — which was published by the Amherst Experiment Station in a special edition, for the purpose of distribution among the farmers, and in the *Centralblatt für Bakteriologie* in Germany. Certainly, some persons think this work on milk is *evidence*. There is a little work done on this side of the water, sir.

There was another point. Great stress was laid upon the statistics of the United States Census. There were a little over 90,000 deaths in 1880 from pulmonary consumption alone, *pulmonary* tuberculosis, not including surgical tuberculosis, or tuberculosis in other parts of the body at all, so that the number of deaths from the disease was much greater than given by Dr. Loring. I am going to ask Dr. Abbot to quote the statistics of this State in regard to tuberculosis.

Another statement made by Dr. Loring was that the bacilli of tuberculosis have been found in tissues unattacked by the disease. That is absolutely impossible. *The actual presence of the bacilli in any part of the body denotes the disease.*

Another thing, Dr. Loring spoke of the utility of the test of injecting these bacilli of tuberculosis into the blood current. The whole of our work for the last year has gone to show the germicidal action of the blood upon bacteria; and it is proper to conclude that experiments by injections of these bacilli of tuberculosis in the blood current are absolutely of no value whatever, because of our increased knowledge in regard to the germicidal action of the blood.

Still another statement which is made, and honestly made, not only here, but in France and Germany and elsewhere, that the cooking of meat destroys the bacilli. It destroys them, certainly, on the outside; but it does not destroy them on the inside. Every experiment that has been made goes to show that a piece of meat is precisely the same as a roll of cloth. The outside, receiving a high temperature, is necessarily affected by it; but the desired result is not produced on the inside for hours and hours. No roast of meat would be disinfected on the inside by two or three hours' cooking. That is accepted by certain authorities whom we believe in, although Dr. Loring may not. And it is not true that the gastric juice always destroys all forms of tuberculosis.

It seems to me that these statements should be corrected before they are allowed to impress themselves too deeply upon the minds of the gentlemen of the Committee. I be-

lieve that Dr. Abbot has certain statistics, which I should like very much to have him read.

Dr. Loring.— I took most of my statements from a Massachusetts veterinarian.* I did not ignore the veterinary surgeons of my own country. On the contrary, I gave them all credit for the industry which they displayed in investigating this matter. But I, for one, felt that it was an immense question, involving almost the entire dairy property of Massachusetts. The remedy for it has not yet been suggested to a sufficient extent to enable us to determine that our herds are not in good condition. But, if they are not, and if cooking does not remove the disease, as a certain veterinarian has said,— I took the statement from him,— and if milk is affected, the next question which arises is an economic question of the utmost importance. That is the object that I had in mind. I do not desire to reflect upon any surgeon or scientist in my own country, or upon any surgeon or scientist abroad. On the contrary, I gave them credit for what they are doing: and I simply asked them to continue in their work as faithfully as they have in the past.

Dr. Abbot.— I have nothing to offer, except that, as Dr. Ernst has requested a statement in regard to consumption in Massachusetts, which you understand is not consumption in cows at all, but simply among human beings, I will give it. We do not know how much tuberculosis there is among cattle. To discover that I understand to be the object of this inquiry. It is not an easy thing to ascertain. I think that it is a rather difficult one, especially in the early stages of the disease in the cow. The same is true of the human being: and all our information upon this subject must come from the deaths that occur from tuberculosis in the State. Those are all obtained from the Registration Reports, which depend for their accuracy upon the individual certificates of physicians who have attended upon persons that have died either in families or in hospitals or elsewhere in the State; and, as Dr. Loring has stated, consumption is upon the decrease in Massachusetts. You will find, fortunately, that it has been upon the decrease for — well, all that we know about it is derived from the Registration Reports, which cover a period of not quite fifty years,— since 1842; but the

* Misquoted Dr. Peters's article in the *Ploughman*.

earlier years I do not consider as very conclusive. The records are rather incomplete for the first ten years,— at any rate, the diagnoses were certainly not so careful then as they are now; but I will say that, while the population has increased, during the last two decades, certainly, more than fifty per cent., the deaths from consumption have held their own, the number of deaths has been about the same. But I will give you the death-rate, which will be a more correct way of looking at it; that is, the number of deaths per 10,000 of the population. The average number of deaths per year from pulmonary consumption, for the ten years from 1870 to 1879, was 33.4 per 10,000 inhabitants. In 1870 it was 34.3. In 1871 it shows a slight diminution,— 33.9. In 1872 it was as high as 36.2. In 1873 it was 35.3; in 1874, 32.8; in 1875, 34.7; in 1876, 32.2; in 1877, 32.9; in 1878, 32.0; in 1879, 30.4,— the average for the ten years being, as I have said, 33.4. From 1880 to 1889 there is a slight diminution, the average for the ten years 1880–1889 being 29.7, as compared with an average of 33.4 for the ten years 1870–1879. But I do not, and I think that the physicians generally do not, take that as an indication that the causes of consumption or tuberculosis are less prevalent than formerly: that is simply a matter that we cannot explain. I do think that the intelligence of the people as to the prevention of consumption and the acknowledgment that it is an infectious disease,— we know that it is an infectious disease,— there is no doubt about it whatever,— we know that it can be communicated from one person to another, from one animal to another: we know that it can be communicated from animals to men, and from men to animals,— that is a matter that has been demonstrated time and time again — I have seen it done,— as I say, I take the intelligence of the people with regard to the prevention of consumption, and their knowledge of its infectiousness, to be one of the explanations, in the case of tuberculosis, as it is in the case of other diseases, of this variation of the percentage shown by these statistics. Many other diseases have diminished in that same period, and others have increased. But I take it that what we call the infectious diseases, the truly preventable ones, have diminished very largely, because of the intelligence among the people as to the modes of preventing the dissemination of those diseases.

Now, with regard to the difference in different counties of the State: it is true that tuberculosis has prevailed to a greater extent for the whole of this period in the eastern counties than in the western counties. In 1880, the ratio of deaths from pulmonary consumption to the total mortality was, in Barnstable County, 18.28; in Berkshire County, the other end of the State, it was 13.29; and in Dukes it was 20.00. But I do not consider Dukes and Nantucket as being conclusive, because the population is very small,— only some six thousand altogether. But tuberculosis, as I say, has been more prevalent in the eastern than in the western part of the State. The fact that the people are brought more closely together in the eastern part of the State than they are in the western part may have something to do with that. But, then, again most of the large hospitals and institutions are in the east; and there are a great many people who come from the western part of the State to these institutions to be treated, and they die there. The difference in the climate, perhaps, affects it to a certain extent. But I think that density of population is not a cause of tuberculosis at all. It is simply a condition. When you bring two men so near together that they will infect one another, they are more likely to take disease than they would be if they lived some way apart, as they do in the western part of the State. Therefore, I say that density of population is not a cause, but it is a condition: you put those men in a proper condition for the causes to act.

The CHAIRMAN.— Doctor, would you make any comment at all upon the fact of the decrease of consumption, the percentage of tuberculosis, among people, and the increase of it among cattle, and milk, etc.?

Dr. ABBOT.— I am not sure that we know that it has increased among cattle and milk or not. I do not think that our records for the past years are conclusive upon that. It is only within a very few years that we have known much about the prevalence of tuberculosis among cattle from actual *post-mortem* examinations. We know that it is prevailing among them now, but I do not think that we really know much about the extent to which it prevailed fifteen or twenty years ago.

The CHAIRMAN.— Then you think that the statistics gath-

ered by the Agricultural College and the Boards of Cattle Commissioners, etc., have not been sufficient to make a result determinable?

Dr. ABBOT.— I think not. I think that we should require to know the extent to which it has been prevalent among cattle. I wish that this inquiry were broader, so as to include other things. Here is one thing that I think has not been brought out: that a cow is the promoter of two classes of diseases from herself to man. One is controlled by the cow herself, that is, she has it in herself, like tuberculosis, and possibly scarlet fever, as shown in Hendon in England; in the next place, diseases developing outside,— I do not think that typhoid ever develops in a cow at all, but it is possible for it to be propagated in milk. I traced that out, and concluded that it might be propagated in milk, whereas the cow had nothing directly to do with it.

Dr. CLARK.— We have now an association of the Boards of Health of Massachusetts. I have been interested more or less in the matter of tuberculosis, brought about by the case that I spoke of a few minutes ago; and I have made some inquiries among the various members of this association, but have so far failed to obtain an answer in the negative from 100 members of that Board, although I have not obtained replies from all the members. But, at any rate, the great majority of this State Board of Health Association, made up from the members of the various Boards of Health in Massachusetts, have stated explicitly that they think that more legislation is demanded in regard to the subject of tuberculosis. They believe that it is time that the State took this matter in hand and provided adequate legislation, so that there may be placed in authority persons to enforce regulations in regard to tuberculosis. As I have said before, all the legislation that we have at the present time is simply the fact that we can quarantine animals and isolate them; but that will not rid the community of the disease. And, when I say that more legislation is needed, I can speak honestly, that it is the opinion of the majority of health officers in this State that such a course is demanded.

The CHAIRMAN.— Is there any other gentleman here who would like to be heard in reference to the views expressed here this morning? Is there anything to be said on the other

side of the case? The Chair hears nothing. Mr. Motley, I think that you will see that it is absolutely necessary that we should have something definite before us that we may be able to present to the Legislature.—some ideas, some recommendations, so far as legislation is concerned. When we have that in our hands, and your report, we shall be very glad indeed to do what we can to remedy the existing evil. Dr. Peters, is there anything special that you would like to speak on for a few minutes with regard to this subject? Is there anything more to be said? If not, the hearing is closed.

(Adjourned.)